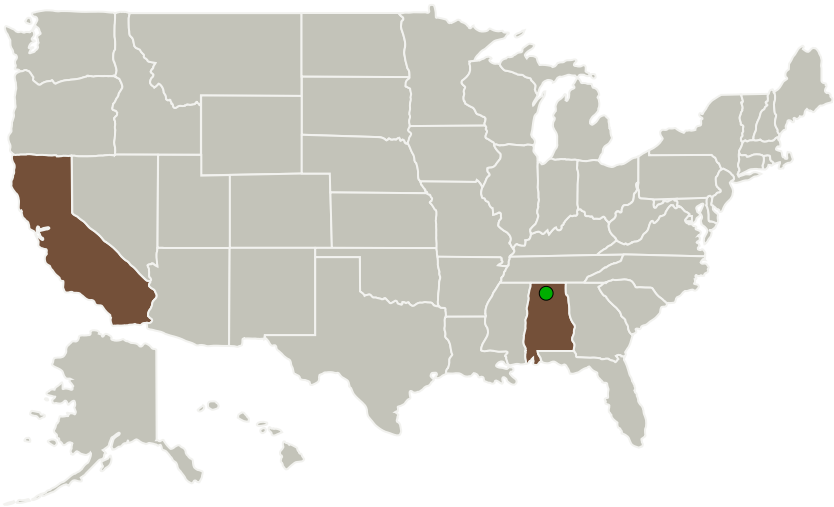
Remote UV Fluorescence Lifetime Spectrometer, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

In-situ studies of the rocks, minerals, and soil on the Moon's surface provide a wealth of information during field geology and the mining phase for planetary resource identification. Sensitive optical spectroscopic instruments such as X-ray fluorescence spectrometers coupled with UV fluorescence spectroscopy is vital for lunar science. Many moon rock samples contain mineral oxides in the forms of Al2O3, TiO2, FeO, MnO, MgO, Cr2O3, Na2O and CaO. Further tests have shown that some of them exhibit fluorescence when exposed to UV light. Traditional UV fluorescence spectroscopy used in analysis of organic and inorganic materials utilizes power hungry, bulky lasers. Recently introduced UV-LED and semiconductor UV lasers with powers > 10 mW are small, reliable, and power efficient making them ideal for use in space exploration. Redondo Optics Inc, a world leader in design and development of fluorescent scientific instruments, proposes to develop a highly innovative and sensitive, light-weight, hand-held space qualified frequency domain fluorescence lifetime measurement system for NASA using heterodyne cross correlation technique. The instrument also includes an ultra miniature 340-780 nm spectrophotometer. The combined spectrometer utilizes lowest power COTS electronics components for fast and accurate estimation of fluorescence lifetimes to identify the rocks spectral signature.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Redondo Optics, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Redondo Beach, California
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	California

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140012)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Redondo Optics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Edgar A Mendoza

Co-Investigator:

Edgar Mendoza

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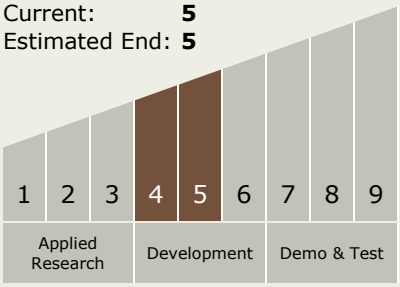
Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.3 Optical Components

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System